



St. PETERSBURG  
**METALLIC WORKS.**

AT THE WORLD'S  
COLUMBIAN EXPOSITION  
AT CHICAGO.

1893.



DETAILED LIST OF ARTICLES EXPOSED

BY THE

**St. Petersburg Metallic Works**

AT THE

WORLD'S COLUMBIAN EXPOSITION

IN 1893

**AT CHIKAGO, U. S. A.**



S.-PETERSBURG, RUSSIA.

1893.

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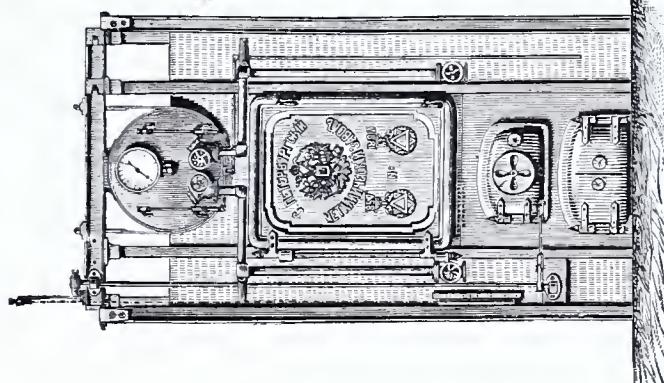
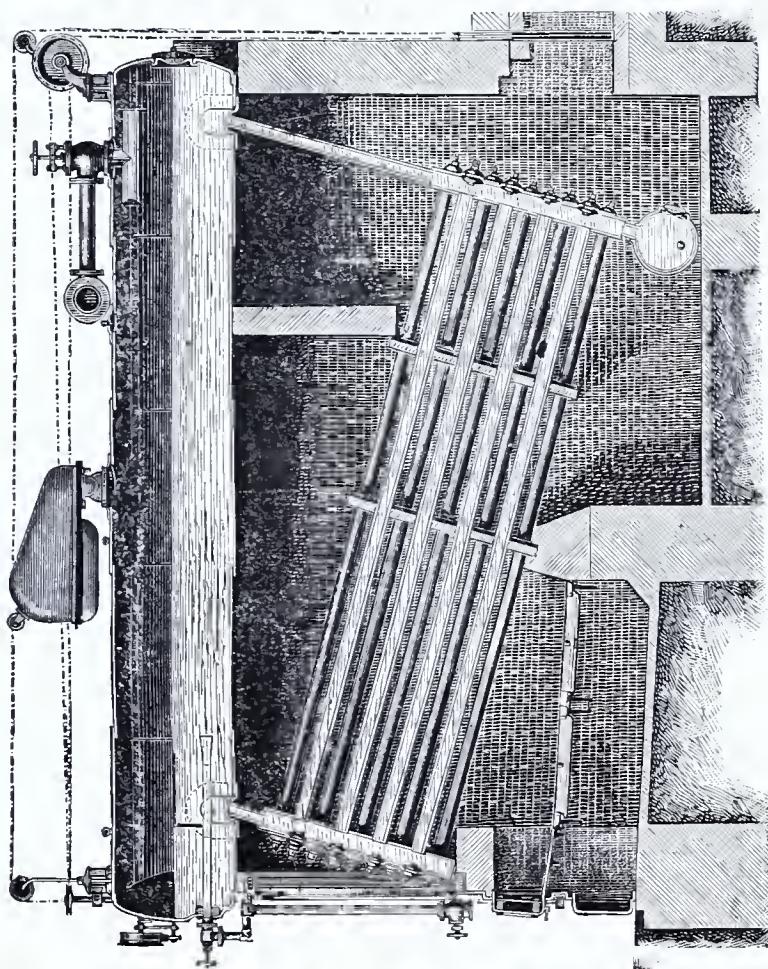
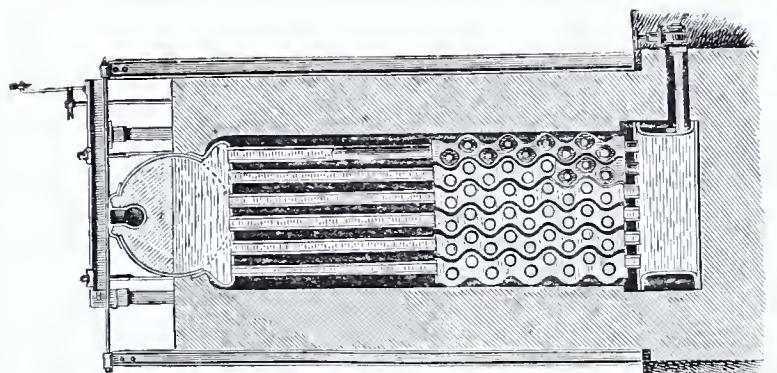
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No.	Articles exposed.	Section. Group. Class.
1	Iron pipe conductor. diameter 2", for heating by steam, with a needle steam bronze slide-valve, brass funnel and 2 bronze valves, $1\frac{1}{2}$ " in diameter, on two frames . . . . .	H.115,726.
2	Welded furnace flue, diam. 42", length 42", thickness $\frac{3}{8}$ ", with flanges. two transverse beams and one soldered transverse Galloway's tube, manufactured of fusible iron; the whole for a Cornish boiler. . . . .	
3	Pocket box for Babcock and Wilcox steam boiler, of fusible iron. $\frac{3}{4}$ " thick; stamped from an entire sheet, for 7 pipes . . . . .	
4	Welded Galloway's tube, length 33", diameter $5\frac{1}{2} \times 9\frac{1}{2}$ ", thickness $\frac{3}{8}$ ", with 2 flanges . . .	
5	Welded Galloway's tube, length 60", diameter $5\frac{1}{2} \times 9\frac{1}{2}$ ", thickness $\frac{3}{8}$ " with 2 flanges . . .	
6	Welded iron bottom for Cornish boiler, diam. 5', with opening 30" in diameter for furnace flue; bottom stamped at one heating . . . . .	E,69,413.
7	Welded iron bottom, diam. 6'6", with opening 42" in diam. for Cornish boiler; bottom stamped at one heating . . . . .	
8	Welded iron boiler bottom, diam. 6'6", with 2 openings of 29" in diameter each; stamped at one heating . . . . .	
9	With the above a complete set of the parts of a manhole opening: 1 cover, 2 brackets and 2 bolts; the cover and the brackets were stamped from fusible iron . . . . .	
10	Girder corrugated iron 14' long. 21" wide, lit. E.	L,152,889.
11	" " " 14' " 22" " " D.	
12	" " " 14' " 23" " " D.	

N <sup>o</sup>	Articles exposed.	Section. Group, Class.
54	Sketch showing the construction of air-closets.	L,147,829.
55	Drawing of the graphical designs of the progress of work in lowering 3 buttresses and an abutment for the bridge across the Oka river, near the town of Alexin. The descent was effected by pneumatical appliances . . . . .	L,152,880.
56	Drawing showing the lowering of caissons by means of wells at the construction of the buttresses for the bridge across the river Aa.	
57	The same.	
58	Drawing of pivot gun-carriage, Krell's system, for mountain $2\frac{1}{2}$ " screw guns. . . . .	H,113,716.
59	Drawing showing the construction of a system of heating by air and ventilation by means of cast iron heat-generators in the Russian theater at Helsingfors; arranged by the Metallic Works in 1876. . . . .	
60	Drawing showing the construction of a system of heating by water and ventilation of a forced draught, and drying chambers for clothes of workmen of the Kalinkin Brewery at St.-Petersburg; arranged in 1880. . . . .	L,147,229.
61	Drawing showing the construction of a system of heating by air and ventilation by means of cast-iron heat-generators in St. Andrew's, Cathedral at St.-Petersburg; arranged in 1875.	
62	Drawing showing the construction of a system of heating by water and ventilation by separate heat-generators, with mechanical dampers and forced draught, arranged by the Metellic Works in 1879 for the St.-Petersburg Prison . . . . .	
63	Photograph of the Elevator at Warsaw . . .	L,154,899.

N <sup>o</sup>	Articles exposed.	Section. Group. Class.
64	Photograph of Hydraulic gun-carriage for 11" mortar, Krell's System . . . . .	H,113,716.
65	" Babcock and Wilcox's steam boiler	
66	" Barbet gun-carriages for two 12" guns 30 calibers long on the Iron-clad "Sinope" . . . . .	F,69,413,
67	" Barbet gun-carriages for two 12" guns on the Iron-clad "Dvena dsad Apostolof" . . . . .	
68	" Krell's gun-carriage, for 2 <sup>1</sup> / <sub>2</sub> " mountain gun, made for being taken to pieces. Tested at an angle of 10° below and 40° above the horizontal line. . . . .	H,113,716.
69	" Krell's central gun-carriage for a 6" gun 35 calibers long of Brink's system. . . . .	
70	" Barbet gun-carriages for two 12" guns 30 calibers long, on the Iron-clad "The Emperor Alexander II". . . . .	
71	" Dock-bridge at Sebastopol . . . . .	G,85,530.
72		
73	" General "view" of a 100 ton floating crane at Sebastopol . . . . .	F,69,430.
74	" The same . . . . .	
75	" Elevator at Warshaw. . . . .	
76	" General view of the 4 elevators at Warsaw . . . . .	L,154,899.
77	" Rafters over the passage in the Verkhny Torgowy Riady, Moscow. . . . .	
	" The same. . . . .	
78	" Bridge across the river Oka. . . . .	
79	" Bridge of 3 spans, each span with an opening of 25 sajenes, across the river Beresina . . . . .	G,80,499.
80		

N <sup>o</sup>	Articles exposed.	Section. Group. Class.
81	Photograph of Briedg across the river Moskva near the Shepeliha village . . .	L,152,889.
82	" Arches of the central building of the Moscow Exposition of 1882; in the yard of the Metallic Works. . . . .	
83	" Caisson limber; view of the buffers and of the lower frame . . . .	H,113,715.
84	" Caissons; front and back carriages	
85	" 100 ton crane on the river Ohta .	F,69,430..
86	" View of the St.-Petersburg Metallic Works . . . . .	H,121.
87	" Bridge across the river Oka near the town of Alexin . . . . .	
88	" Interior view of the covering of the passages in the Verkhny Torgowy Riady at Moscow. . . . .	G,80,499,
89	" Rafters over the passages in the Verkhny Torgowy Riady at Moscow. . . . .	
90	" Iron framing for smithy; in the yard of the Works. . . . .	L,152,889.
91	" View of front bottom of a Cornish boiler with 2 furnace doors and	
92	" 2 manholes . . . . .	F,69,413.
93	" Interior view of the pavilion of the Works at the Moscow Exhibition of 1882. . . . .	H,121.
94	" Steam disinfecting chamber with vertical boiler and appurtenances.	
95	" The adaptation of flat batteries in arranging heating by water in houses . . . . .	
96	" The adaptation of vertical flanged stoves in heating by water in houses . . . . .	L,147,829.
97	" Krell's cast-iron double battery square stoves . . . . .	
	" Section of such stove, dimension № 1.	



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# ORGANIZATION, STATE AND ACTIVITY

of the

## St.-Petersburg Metallic Works.

(1857—1893).

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The Company of the St.-Petersburg Metallic Works was established in 1857, its Statutes being Imperially sanctioned on the 20-th December of the same year.

At its outset, the Works restricted its manufacture to the working of simple articles manufactured of copper, iron and steel, such as: wire, nails, patent axles and carriage springs; besides, it manufactured plated silver things, rolled copper, latten, etc.

Gradually, the Works began to execute more complicated objects in the manufacture of which it is at present engaged, and which have established its reputation and good fame.

The objects manufactured by the Company, and the works undertaken by it, may be thus classified:

Water, steam and pneumatic heating. Ventilation with artificial damping of the air. Laundries, baths, desiccating and disinfecting chambers. Krell's heat generators, flanged stoves, etc.

Iron bridges, turning tables, switches, shunting plates (railway frogs), semaphores. Caissons. The lowering of caissons by pneumatic appliances and wells.

Iron constructions. Rafters, domes and church spires. Iron and cast-iron columns, beams. Iron and cast-iron staircases, balustrades and railings.

Corrugated iron. Vaults, ceilings, roofs and roofings, doors and chimneys manufactured of corrugated iron.

Cast-iron pipes, iron, copper castings of all kinds. Cogwheels manufactured without models, by means of a moulding machine.

Boilers of all systems, heaters; stamped iron boiler bottoms, Galloway's tubes. forgings. Bolts and rivets.

Steam engines. Hydraulic steam pumps, accumulators. Hydraulic hoisting machines for raising men. Hydraulic turning and travelling cranes and hoisting apparatus.

Iron sheaves, gearings, bearings and supports.

Hydraulic gun-carriages for turret-guns for Iron-clads. Gun-carriages with hydraulic compressors; caissons, steel projectiles, shrapnel and other artillery appurtenances.

Granaries, elevators, and hoisting apparatus, for raising dry substances and liquids.

Process of galvanizing iron; articles manufactured of galvanized iron and zinc.

Stamped vessels manufactured of steel, iron, copper and latten. Iron barrels for transporting alcohol and naphta. Gas-works using coal or naphta, gasholders. Air closets, galvanized iron sinks, water tanks.

The workshops of the store-houses, offices, and dwellings, attachd to them, cover an area of 16,500 square sajenes; they contain the following machinery, lathes and tools:

20 steam engines giving a total of 310 H. P.

11 steam boilers with a heating surface of 5000 sq. feet.

6 steam hammers (the biggest for 200 pood power).

2 dynamos and 1 dynamo-motor.

5 mechanical anvils.

1 forging machine.

1 forging hydraulic press.

4 mechanical presses for stamping bolts and rivets.

2 hydraulic presses working with a pressure of 200 atmos.

4 hydraulic rivetting machines developing a pressure of 80 atmos.

24 welding and heating furnaces.

2 cupolas, giving each 200 poods of cats-iron per hour.

6 drying chambers of different sizes.

80 hearths.

358 different mechanical lathes for turning metal and wood; amongst them there is one lathe for turning objects of 33 feet in diameter.

220 Locksmith vices.

Railways-lines, supplied with the necessary number of turning tables, pass in all directions, and connect the workshops with the store-houses. Finally, in the workshops and yard of the Works, there are 40 different cranes and hoisting machines for lifting loads varying between 25 and 600 poods; they are also adapted for transmitting heavy objects from one lathe to another and for packing them for transportation.

The establishment, working under normal conditions, employs

from 1000 to 1500 skilled hands at the course of R-s 600.000 for wages per annum. The annual turn-over averages from 2 to 3 million roubles.

The following data convey an idea of the activity of the Works.

260 remarkable plants were fulfilled for heating with water, steam and air, as well as for ventilating laundries and baths; giving over 40.000,000 units of kilogrammes of heat per hour.

230 bridges were constructed, comprising.

667 spans in all, and giving a gross weight of 1.000,000 poods. The longest bridge (the one across the Oka river on the Rjagsk-Viazma R. R.) is 153,6 sajenes long, with a longest span of 37 sajenes. The longest span constructed by the Works is 50 sajenes long, in the Rjev-Viasma R. R.

142 iron constructions were fulfilled for roofs, spires, domes, etc. weighing in all about 700.000 poods and covering an area of nearly 100.000 square sajenes; amongst these constructions is the central building of the Moscow Exposition of Arts and Trades in 1882, which occupies an area of 7832 square sajenes. The contract was concluded on the 2-nd of May, 1879 and the building was completed on the 31-st of January, 1881.

The weight of the most remarkable constructions made of iron girders for supporting floors and ceilings, of cast-iron columns, etc. at 182 places, is about 1.000,000 poods.

Fire proof ceilings and corrugated iron roofs cover an area of 40.000 sq. sajenes.

Up to 1892, inclusively, about 540.000 poods of wire had been drawn.

About 530.000 poods of latten were prepared up to 1884, when its manufacture was discontinued.

Since 1880, when the Works undertook the construction of boilers, 770 steam boilers wire turned out, giving a heating surface of about 3.000,000 sq. feet.

Over 300.000 steel drawn projectiles of different sizes and systems were prepared.

Up to 100 gun and mortar carriages of different systems had been worked out.

In 1889 a 100 ton floating crane for the Sebastopol port was constructed by the Works during 5 months. The metallic parts of the crane with pontoon, weigh about 50.000 poods.

From 1890 the St.-Petersburg Metallic Works has built elevators and granaries, giving a capacity of over 200.000 chetverts, with all the appliances for the loading, unloading and sifting of grain.

The following hydraulic turret and barbet mountings were designed and constructed by the Works for Iron-clads of the Russian Government since 1886:

**A) For squadron Iron-clads of the Black sea fleet.**

„Tchesma“	2	barbet	mountings	for	two	12	inch	guns	of	35	calibers	each.
„Sinop“	3	“	“	“	“	12	“	“	“	30	“	“
„Dvenadsat Apostolof“	3	“	“	“	“	12	“	“	“	30	“	“

**B) For squadron Iron-clads of the Baltic fleet.**

„The Emperor Alexander II“	1	barbet	mount.	for	two	12	inch	guns	of	30	cal.	each.
„The Emperor Nicolas I“	1	turret	“	“	“	12	“	“	“	30	“	“

At present 2 turret mountings are in work for two 12 inch guns of 40 calibres each, well balanced, worked by hydraulic pressure and by hand, for the squadron Iron-clad of the Black sea fleet „Tri Sviatitelia“.

The St.-Petersburg Metallic Works has received the following rewards:

- 1) Small gold medal of the St.-Petersburg Agricultural and Industrial Exposition of 1860.
- 2) Three Imperial Arms of the Manufactural Exhibitions of 1861 at St.-Peterburg, of 1865 at Moscow and of the Russian Manufactural Exposition of 1870 at St.-Peterburg.
- 3) Large silver medal of the Moscow Politechnical Exposition of 1872.
- 4) Medal of the London International Exposition of 1874.
- 5) First class gold medal of the Brussels International Hygienic Exposition of 1876.
- 6) Honorary Mention of the Brussels Hygienic Exposition of 1876.
- 7) Laudatory Mention of the Exhibition of the Imperial Russian Technical Society in 1880 at St.-Peterburg.
- 8) Two Imperial Arms of the Russian Exposition of Arts and Industry at Moscow in 1882.
- 9) Laudatory Mention of the Medico-Hygienic Exposition of 1889 at St.-Peterburg.
- 10) Silver medal of the St.-Petersburg Electric Exposition in 1892.
- 11) Order of St. Anne of III-rd degree to the Director of the Works at the St.-Petersburg Exposition in 1870.
- 12) Order of St. Anne of II-nd degree to the Director of the Works at the Russian Exposition of 1882 at Moscow.

13) Order of St. Stanislas of II-nd degree with star to the Director of the Works for the successful completion of the hydraulic mountings on the Iron-clad „Tchesma“.

14) The Director of the Works Otto Jegorovitch Krell was promoted Honorary Engineer-Technologist of the St.-Petersburg Technological Institute for services rendered to the development of Russian Industry.

From 1867 to 1892 the St.-Petersburg Metallic Works was managed by the Engineer-Mechanic Otto Jegorovitch Krell. From 1892 the Works is directed by the Engineer-Mechanic Frantz Ivanovitch Vencelides.







Boiler of the Galloway's Works.  
Boiler of the Petersburg Metallic Works.

